

**REACHING FOR THE RED PLANET.** M. L. Urquhart, *Laboratory for Atmospheric Physics, University of Colorado, Boulder CO 80309-0392, USA, urquhart@argyre.colorado.edu.*

A scientist-teacher partnership between a 5th year graduate student in Planetary Science at the University of Colorado in Boulder, and a teacher from Van Arsdale Elementary School in Arvada, Colorado has resulted in the development of a **new curriculum** centered around planning a Mars colony, and ending with a scaled-down version of the previously existing MarsVille project developed by the Challenger Center for Space Science Education. Tailor-made for a gifted and talented program composed of students from grades 4-6 (ages 9-12), the curriculum *Reaching for the Red Planet* is designed to teach a variety of concepts and skills with an emphasis on planetary science.

The project entails learning general facts about the planets, learning about the Earth's environment, learning about Mars, choosing a purpose for a colony on Mars, and planning and designing a colony on Mars. The students will use drawings, creative writing, research skills, team work, math, and the scientific method to explore their own environment, and design an artificial one for Mars. Several assignments, a teacher's tour guide to the planets, and a guide to current and planned Mars missions are included in *Reaching for the Red Planet* and experiments for the students to perform in class are explained in detail. Although the Mars colony material was originally designed to utilize University resources and extensive classroom time with the graduate student involved, neither is essential to the program, and the included teacher guides have been added to minimize (if not eliminate) the need for outside assistance.

*Reaching for the Red Planet* was classroom tested in the Spring of 1996: the response from the teacher-partner (Dianne Connolly) and the students was excellent. Suggestions for improvement of the project after the initial classroom testing have been included in the current edition of the program. Over fifty copies of the hardcopy version have been distributed to teachers and institutions all over the United States and in Australia. *Reaching for the Red Planet* is available over the World Wide Web, and has received outstanding reviews from educators. The Web version (updated more frequently) provides links to other relevant sites, and has a downloadable slide show for a tour of the solar system.

### **Educational Objectives:**

\*To teach students about their environment, the physical properties of the terrestrial planets and their satellites, and how those properties affect the environments of those planets/satellites.

\*To teach math concepts relating to distance, and weight and measure.

\*To teach students specifically about the planet Mars (atmosphere, seasons, geography, geology, climate), and about similarities and differences with the Earth.

\*To teach students basic engineering/spatial relationship skills

\*To increase student awareness of current and future scientific endeavors (Mars Pathfinder, Mars Global Surveyor and the Mars Surveyor Program, Biosphere II)

\*To aid students in the development of good team work, problem solving, decision making skills, and understanding of the scientific method.

\*To expose students to the scientific, technological, cultural, and environmental issues related to space exploration.

\*To provide students with a creative outlet related to a real scientific problem.

**The program consists of 12 different modules, some of which can be used in part or in whole as small separate projects. Each module contains lesson plans and assignments, and many contain experiment ideas and/or teacher guides. The modules are:**

- 1) What do you need to live everyday?
- 2) What are other planets like?
- 3) Why are we focusing on the inner planets/satellites?
- 4) Distances in the Solar System
- 5) Why is Mars the best planet for a colony? (Or is it?)
- 6) Why would we want to colonize Mars?
- 7) What does a colony need?
- 8) How do systems work on the Earth?
- 9) Who would the colonists be?
- 10) Colony design
- 11) Planning the trip to Mars
- 12) Bringing it all together

**The WWW version is available at:**

<http://lyra.colorado.edu/sbo/mary/redplanet.html>